Amateur Radio’s View on CubeSat Spectrum and Licensing Issues

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CubeSats are Vital to the Health of the Amateur-Satellite Service

• The small size and non-traditional launch mechanisms for small satellites constitute a relatively affordable means to access orbital resources.

• Nearly all modern Amateur Radio satellites follow the CubeSat model.

• Although satellite mass and size are not relevant from a licensing or frequency management perspective, these factors have permitted CubeSats to be successfully used by new spacefaring nations.
Licensing and Frequency Assignment Has Improved

• For a while, it seemed to radio amateurs that non-amateur CubeSat designers were choosing 145 MHz and 435 MHz just because we proved those frequencies worked.

• We welcome NTIA’s efforts to find appropriate spectrum for federal projects.

• We welcome the FCC’s licensing approach as a good faith effort toward placing space stations in appropriate radio services. We suggest that Section 97.113(a)(3)(iii) could be more liberally applied for academic projects.
Frequency “assignment” in the amateur bands is unique

- Amateur licenses are not frequency specific.
- In the terrestrial amateur service, operators pick their own frequency within a number of broad allocations.
- Frequency “assignment” in the amateur-satellite allocations is actually a coordination process administered by IARU.
- See IARU web page for information, procedure, and forms.
If an Administration Licenses It, IARU Will Coordinate It (For Now)

• We have coordinated a number of systems that frankly cannot be construed as amateur-satellite systems, even with liberal interpretation of the classroom instruction exception.

• Such coordinations are **NOT** endorsements from the amateur community—they are a pragmatic response to the undeniable truth that an administration can license stations as it sees fit, including by improperly shoehorning them into a particular satellite service.

• The problems caused by a coordinated satellite improperly shoehorned into the amateur-satellite service are much less than those caused by an uncoordinated satellite improperly shoehorned into the amateur-satellite service. Thus, IARU will coordinate.

• We find these situations are becoming a bit less common, thanks in large part to NTIA and FCC efforts.
What can be done to speed up the frequency assignment process?

- Presuming you’re going the IARU Coordination Route:
  - Don’t ask for 145 MHz.
  - Fill out the paperwork completely and candidly.
  - Have some flexibility.

- Practically, the participants on the IARU frequency coordination panel do this as an avocation. If you need the speed of someone paid to accomplish the job, you might ask the regulator whether the amateur-satellite bands are right for you.
What if CubeSats Increased by an Order of Magnitude?

- Presuming such an increase in active amateur satellites, we would have to reconsider our voluntary terrestrial/satellite division within the amateur allocations.
- Our ability to accommodate non-amateur projects in the amateur-satellite allocations would become proportionally more untenable.
- CEPT has proposed to look at spectrum requirements for the satellite operations service at WRC-19. We’ll see if it makes the agenda by the end of November.
What Bands Are Suitable?

• It is unclear to ARRL that CubeSats must continue to utilize VHF and UHF almost exclusively, although that’s what the CEPT proposal for WRC-19 suggests evaluating (for unspecified “technical reasons”).

• There are existing space operations allocations overlapping terrestrial fixed and mobile.

• It depends both on the space operations use and the terrestrial service use.

• The answer is not simple, and will vary from case to case.
Can CubeSats Use TDRSS?

• I learned something by being invited to present here. My first reaction to this question was, admittedly, “What’s TDRSS?”

• I looked it up. It looks really cool. It would be great if NASA and CubeSat designers could work something out.

• I suspect that radio amateurs developing and operating CubeSats for Amateur Radio will continue to use the amateur-satellite allocations for direct transmission of telemetry.
• The ITU Radiocommunication Assembly (RA-15), meeting this week in Geneva, approved a draft new Resolution titled:
  – Improving the dissemination of knowledge concerning the applicable regulatory procedures for small satellites, including nanosatellites and picosatellites
• Relevant ITU-R Study Groups will be developing materials toward this end.
In Summary

• Amateur Radio loves CubeSats.
  – We are grateful for their facilitation of a useful amateur-satellite service.
  – We respect their contribution to the advancement of science.

• Our accommodation of non-amateur satellites is untenable in the long term.

• We support:
  – Further study of spectrum solutions,
  – Adoption of those that adequately protect incumbent services (if any), and
  – Consideration of bands outside of the VHF/UHF range.
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Translation:
Thank you, and best regards from Switzerland—Brennan

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